The Effect of Income Choice on Bias in Policy Decisions Made Using Cost-Benefit Analyses

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first submitted November 24, 2002

Resubmitted November 7, 2003

Abstract

Cost-Benefit Analysis (CBA) is often used in policy decisions to determine the economic value of various choices. Although the effects of income disparity are well accepted, one of the reasons for the success of this type of analysis is that many policy-makers and analysts consider the results of a well-crafted analysis to be largely free of partisan or political bias. Here I propose that tradeoffs between the benefits of various possible jobs or careers introduce a significant bias into values imputed based upon willingness to pay measures. In particular, I demonstrate why we might expect the values of various segments of society to be differentially appreciated by CBA. Empirical evidence is presented indicating that there is a significant negative correlation between the importance an individual places on income and the willingness of that individual to forgo consumption in favor of environmental improvement, as well as a correlation between the importance of income and actual income. These results suggest that CBA as a tool of welfare economics is likely to be biased against environmental protection because concerned individuals are likely to choose careers which do not maximize consumption, thus decreasing their ability to pay for both real and hypothetical environmental improvements. Moreover, the size of this bias appears to be large.

Key Words: Cost-Benefit Analysis; economic valuation; ecological valuation; consumption; income choice.

1 Introduction

The study of public economics has three main functions: 1) to understand economic systems, 2) to develop efficient methods for carrying out public policies that have already been decided upon, and 3) to suggest which policies to implement. The first and second functions have been called *positive economics*, while the third is often termed *welfare economics*. In this paper I will suggest that the use of economic measures for welfare applications can allow for the /em de facto preference of one set of values over other sets, thereby inherently biasing the political decisions to which it is applied. This is likely to result in a hidden political advantage for those adhering to the preferred value set.

The use of cost-benefit analysis (CBA) in public policy has been growing over the last three decades. Its early use in the review of environmental and health policy began with attempts by Presidents Nixon, Ford, and Carter to increase executive influence over the regulatory process, under titles such as "Quality of Life Reviews" and "Inflation Alerts". Then, in 1981, President Ronald Reagan issued Executive Order 12291, which required agencies to submit Regulatory Impact Analyses (RIAs) on all major proposed regulations for review by the Office of Management and the Budget. This order required that "the potential benefits outweigh the costs" and "of all the alternative approaches to the given regulatory objective, the proposed action will maximize net benefits to society" (for a discussion, see Morgenstern, 1990; Pildes and Sunstein, 1995). By 1983, the U.S. Environmental Protection Agency (EPA) had issued its *Guidelines for Performing Regulatory Impact Analysis*, which it recently updated in order to reflect the flurry of new activity which this area has undergone (EPA, 2000). Examples are the *Unfunded Mandates Reform Act of 1995*, Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*), and, most importantly, the 1993 Executive Order 12866 (*Regulatory Planning and Review*, which superceded EO 12291). This last directive, issued by President Clinton, adds some flexibility for agencies to consider distributional and equity effects, but retains from EO 12291 the requirements for CBA and the examination of alternative approaches. In the mid 1990's, attempts by the Republican-controlled Congress to strengthen

CBA requirements failed (Morgenstern, 1997), but John Graham, George W. Bush's Administrator of the Office of Information and Regulatory Affairs, has been more active than his predecessors in his enforcement and interpretation of EO 12866 (EPA, 2000; Graham, 2002; Craig, 2003). CBA is today involved in numerous decisions regarding "whether, when, and how to regulate" (Portney, 1990).

This increased reliance on CBA in recent years stems largely from a desire to increase reliance on objective, quantitative methods for policy comparison and optimization. Given that not all public projects can be fully funded, CBA allows one to compare various options and reject the allocation of scarce funds to those projects which do not provide sufficient margin of return or which do not pass some other criterion used in quantitative or semi-quantitative decision-making. The classic criticism that CBA ignores things of value which are not traded in markets, or ignores non-use values like existence value, has been mitigated to some extent by the increasing use of non-market mechanisms (hedonic pricing, contingent valuation, *etc.*) to impute willingness to pay (WTP) for these goods, although standard regulatory cost-benefit analyses continue to apply these techniques conservatively if at all (see, for example, Johansson *et al.*, 1995; Bateman and Willis, 1999; Farber *et al.*, 2002). The ability of CBA to fully overcome this criticism remains a point of discussion in the literature.

2 Biases in Cost-Benefit Analysis

Certain biases in CBA are well known, for example the fact that the desires of high-income individuals are necessarily preferred over those of low-income individuals (for discussions, see Executive Order 12866; Zeckhauser, 1981; Railton, 1990; Sen, 2002). However, this bias is present throughout any market economy, and traditional economists point to standard arguments about Pareto efficiency and the ability to address these inequities through progressive tax systems as reasons to leave income weights out of CBA (Frank, 2001). This discussion is well-presented elsewhere (see, for example, Adler and Posner, 2001).

Individuals who cannot afford to pay for an environmental improvement and so refuse

to give a positive value for that improvement on a contingent valuation (CV) survey, are often seen to be acting under legitimate budget constraints in their responses (Soderqvist, 1998; Jorgensen *et al.*, 2001). Given that economists have no claim to particular expertise in questions of social choice, this is usually argued to be an area better left to the policy-makers themselves (Portney, 1998). Even if one is concerned with the redistributive effects of public policy, CBA is viewed by many policy makers as a legitimate method for comparing alternate scenarios where scarcity forces such choices to be made.

With this in mind, proponents (and many detractors as well) of CBA generally consider it to be a value-free exercise. For example, Goulder and Kennedy (1997, p. 25-26) have this to say on the topic:

> Each person's valuation receives the same weight. [CBA] makes no attempt to correct for differences in awareness, education, or 'enlightenment' among individuals. The preferences of people who have no concern for future generations, or who have no sense of ecological implications of their actions, count the same as those of people who are more altruistic or who recognize more fully the fragility of ecosystems. Benefit-cost analysis is nondiscriminating, perhaps to a fault.

In CBA, it is assumed that all individuals contribute to valuation based only upon their market-driven income levels, but that there is no extra weight given for those holding a particular ideology or political affiliation, for example. This ability to compare the preferences of all consumers on an equal footing is one of the factors that makes the use of CBA in policy-making useful. Porter, for example, explains that a desire for "quantification grows from attempts to develop a strategy of impersonality in response to pressures from outside" (Porter, 1995). Sunstein (2002) also suggests that one of the values of CBA is its objectivity in the sense of its discipline in avoiding "interest-group manipulation." Although this belief is controversial (see, for example, O'Brien 2000; Sen 2002), it is a widespread justification for CBA and other quantitative decision-making techniques.

However, if the results of CBA are not what policy-makers imagine them to be (*i.e.*, unbiased, nonpolitical summaries of individual preferences), then the information will be mislead-

ing and improperly applied, even when the analysis is only part of the overall decision-making process. Indeed, O'Brien (2002) argues that the appearance of rationality and objectivity in CBA and risk-assessment allows agency employees and others to convince themselves that their decisions are doing no harm, and therefore allows them to focus on rules of application rather than on the underlying and fundamental concerns she feels apply to these quantitative methodologies.

The issue of concern in this paper is the interaction of fiscal budget constraints with self-selection in the workforce. More explicitly, individuals who choose careers or jobs based upon income levels are likely to have relatively more disposable income than similarly qualified individuals who give more weight to other aspects of a career or job (for example, the sense that the job or career provides society with environmental or social benefits). This differential level of income may then have an effect on the imputed value of various market and non-market goods and services, because those with higher disposable income have more buying power in the market.

Mainwaring (2001) touches on this question from a different angle when she posits that within-peer-group competition for social status gives rise to signaling interactions which then drive consumption in a socially disadvantageous way. This is the reasoning behind the argument that poverty-based disutility is, to a certain extent, relative rather than absolute (see Sen, 1967; Hirsh, 1976; but see Pearce, 1998 for counterarguments). Some authors (for example Dominguez and Robin, 1996) use this observation to argue for drastically lowered levels of economic consumption, and perhaps the substitution of other goods such as time, self-improvement, and job satisfaction (Røpke, 1999; Brekke and Howarth, 2000; Brown and Cameron, 2000). It is clear that at least some individuals voluntarily accept lower levels of income based upon the premise that consumption is harmful to ecological systems. Moreover, and importantly for this paper, one might expect this proportion of the population to increase as the effects of excessive consumption become more obvious in the future. Indeed, those who believe that consumption levels can be reduced voluntarily without governmental coercion necessarily rely upon this assumption.

3 Occupational Choice and Willingness to Pay

An individual's choice of occupation is a complex function of a large number of variables, including income, location, family demands, educational investment, job enjoyment, and the individual's perception of the work's social value. It is important for our purposes to realize that the income portion of the occupational choice function is only a part of the overall function, and yet it is the main determinant of disposable income, which in turn strongly affects an individual's WTP for goods. In the extreme, if an individual chose to take a religious vow of poverty, for example, that individual would presumably do so because she considers aspects of the new life to be superior to the forgone income (assuming she were a rational actor). However, after making this choice, her preferences would no longer affect cost-benefit analyses, because her WTP would be effectively zero. This would be a case where an individual became richer (in the sense of increasing personal utility) and yet lost the ability to participate in economic decision-making.

Let us look at another simple case. Consider two individuals with identical skills and weights in their occupational choice criterion, where both individuals have only two dimensions upon which they make job choices: income and social value. Assume also that the individuals have different belief systems. For example, one might consider it socially benefical to promote a no-extraction policy in national forests for ecological reasons, while the other might consider it socially benefical to increase extraction rates in order to promote timber industry jobs for others. Assume that of all jobs available, there are two positions that provide higher values for occupational preference than all others. Job 1 is a high-paying position which provides no direct social value benefit in the eyes of either individual. Job 2, perhaps an advocacy-type position, provides lower income, but may provide a high amount of social value to the employee if he agrees with the ideals being promoted by the employer.

If we let U_1 stand for the utility from job 1, it will be the same for both individuals because their appreciation of income is the same. However, U_2, the utility from job 2, will depend upon whether or not the individual perceives the advocacy to be socially beneficial. As job 1 pays more than job 2, U_1 will always be higher than U_2 for the individual who

does not see the value in the advocacy performed in job 1. However, the individual whose preferences are enhanced by job 2 will accept the position if the social value is equal to or greater than the income disparity.

4 Political Implications of Occupational Choice

Now, assume that, having made their respective career choices, the willingness of the individuals to pay for a certain good is assessed (through markets, contingent valuation, or other methods) and used in the cost-benefit assessment for a public project. Assuming that WTP increases with income, it should be clear that the desires of the individual who chose the work which gave the added benefit of being socially beneficial will have less of an impact on the policy decision than those of the individual who chose work based solely upon income.

Take as an example a CBA where the question of whether to log a particular national forest is being considered. Let C be the benefit hurdle that the forest must meet in order to avoid logging. In a simple case where a project would be allowed if the current discounted value of the project outweighed the costs, this might be the projected net discounted benefits of logging. However, this might just as easily be the point of indifference for those making the decision, beyond which the results of CBA would be sufficient for them to change their minds. The value that C represents is not important for our analysis, it is only important that C exists, and for this to be the case the CBA must have some effect on the policy decision, which is generally a minimum condition for the CBA to have been commissioned by welfare-interested policy-makers in the first place.

To simplify the example, assume that the income from the conventional job (job 1) is fixed by a competitive job market, and that the job with the perceived social value pays as little as possible to attract a qualified applicant. In that case, the difference in income would be equal to the social value to the ideologically aligned individual of job 2. There will be a range of values for C such that the decision whether or not to log the forest depends entirely upon whether the "public service" position available was, for example, a position that advocated a no-logging policy or an active logging policy. Whichever individual saw

the benefit in the low-paying occupation would find their political position undermined in the CBA. We can label this region C_{indet} for "C indeterminate", and it is the region where the decision to proceed with a project (or regulation, or other public action) depends *not* upon personal preferences related to the project, but upon personal preferences related to pre-market occupational benefits. It is perhaps a concern that as perceived social benefits of a position increase, or as some individuals give increased weight to this category of job choice, the region of C_{indet} grows.

Of course, the above example is contrived. In the real world there are positions available on all sides of most issues, so one might think that the effects could even out or be ignored to a reasonable approximation. However, there are some reasons to imagine that this might not be the case. First, it often happens that public policy debates see one side supported by more heavily funded special interests than the other. When this occurs, those whose social value measures are in line with the well-funded interests are in the happy position of being able to receive high values for both income and their social reward, whereas opponents will be forced to trade one off against the other, *and in so doing lower their relative power in social value determination through CBA*. Of course, most people do not work directly in advocacy of any type, so the question then becomes whether one would expect to see effects of this type actually having a significant influence on the market, or whether they will be limited to the small fraction of the population that works for non-governmental organizations, for example.

This question will be of particular interest in the field of environmental economics for a number of reasons. First of all, many environmentalists and analysts believe that excess consumption is a significant cause of environmental ills (Lintott, 1998; Jackson and Marks, 1999; Brown and Cameron, 2000). If these individuals choose to live in accordance with their principles, then one would assume that the weights given to income in occupational choice would be lower than those for comparatively qualified individuals for whom increased consumption is seen as more of a good. In that case, one could argue that those who "care most" about the environment will have their values underrepresented in cost benefit analyses specifically because they choose to take their compensation for labor pre-market (*i.e.*, their

compensation may not be directly reflected by income or benefits). Extreme examples of anti-consumption attitudes might be observed in religious groups which require vows of poverty, or membership in many "intentional communities" which practice non-market self-sufficiency or disengage from the measured market economy through the use of alternative currencies (FIC, 2000).

The suggestion here is that making public policy choices based upon consumption decisions, whether those decisions are revealed through classical market pricing or through indirect methods such as hedonic pricing or contingent valuation, involves a specific bias generally not considered in the discussion of CBA, beyond the simple preference for the choices of privileged individuals over their less-privileged compatriots. If we have a cohort of individuals with similar abilities, backgrounds, and skills, those for whom monetary consumption is relatively more important will, in a functioning market, fill the higher-paid positions and will therefore have the greatest effect on the "value" of goods.

5 Empirical Evidence for Self-Selection

In this section, we will investigate whether there might be a connection between environmental and income preferences, or more specifically between willingness to pay for environmental protection and the income preference function of individuals, using the General Social Survey (GSS). The GSS is an annual personal interview survey of U.S. households conducted by the National Opinion Research Center at the University of Chicago (Davis *et al.*, 2000). The GSS is designed specifically to provide raw data for analysis by the social science research community. It has been given yearly (except in 1979, 1981 and 1992 for funding reasons) since 1972. The GSS is a ninety-minute, questioner-mediated survey, and the sample population is selected randomly from households across the continental United States according to an algorithm designed to ensure that the sample population corresponds well to the overall household demographics of the country. The GSS is the largest sociology project funded by the National Science Foundation, and as a data set is second only to the US Census in use by US social scientists. The reader is referred to Davis *et al.*, 2000 for a full description.

The hypothesis suggested by the above discussion was that actual income is positively correlated with the perceived importance of income to an individual (the more important income is to an individual, the higher the income that individual will receive), and that a willingness to pay for environmental protection is inversely proportional to the importance of income to an individual. Of course these statements are most meaningful when the effects of covariates such as age, race, and education are held constant.

Interviewers asked the following question regarding the job preference functions of respondents: "Would you please look at this card and tell me which one thing on this list you would most prefer in a job? Which comes next? Which is the third most important? Which is the fourth most important?" Possible responses were: A. High Income (JOBINC); B. No danger of being fired (JOBSEC); C. Working hours are short, lots of free time (JOBHOUR); D. Chances for advancement (JOBPROMO); E. Work important and gives a feeling of accomplishment (JOBMEANS). Of these, we are most interested in correlations with JOBINC. If individuals who consider high income to be important in a job are equally willing to pay for environmental goods as those who do not consider it important, then there might be no preference bias involved in using cost-benefit analysis. However, if people who would be willing to spend money on environmental protection are also less likely to consider income highly in making career choices, then as a class they will be underrepresented in policy determination based upon cost-benefit analysis. A job characteristic coded as "Most Important" receives a 1, "Next Most Important" a 2, and so on, with "Fifth" and characteristics not chosen coded as a 5.

In analyzing the data, I always used the largest population available, based upon when various questions were asked and how individuals responded to the survey questions. This means that environmental analyses focused on the years 1993 and 1994 because these were the years when relevant questions about the environment appeared on the questionnaire. These results are based upon about 900 responses given over the course of these two years. The exact number of responses varies somewhat in cases where respondents did not answer a question or marked "Don't know", as these results are excluded from the analysis.

Our first question is whether actual income is correlated with importance of income in a

job. Hence, we will regress actual family income (REALINC) against JOBINC, controlling for level of education (EDUC), race (RACE), and age (AGE). The variable EDUC gives the highest year of school completed, RACE is a binary variable for black/non-black, and AGE is simply the respondent's age. As all of these questions were asked throughout the survey, in this case our dataset includes all available years (1972-2000, minus 1979, 1981, and 1992) in order to improve the accuracy of the regression. This is more relevant because we can think of the questions "Does desire for income correlate with income?" and "Does WTP correlate with income?" as two separate questions, and so it makes sense to answer each question with the most data available.

We find that REALINC is negatively correlated with JOBINC with a p-value of < 0.001. Because a low value of JOBINC means that a person considers income to be very important in a job, this means that, for a given value of education, race, and age, caring about income is very strongly correlated with receiving a high income. Hence, the results of this survey are consistent with the hypothesis above that if income is not a high priority for an individual, jobs are likely to be chosen for their other qualities, and income likely will suffer as a result. In the above regression, there are 16,618 valid responses, with REALINC ranging from \$363 to \$162,607 per year, with a mean of \$30,200. When REALINC is expressed in constant 1986 dollars, the beta value for JOBINC was -894, indicating that the difference in income between those for whom income is the most important factor in a job and those for whom it is the least important factor was about \$3,600 per year, comparable to 1.2 years of extra education (the beta value for EDUC was \$2,934, with EDUC also having a p-value of less than 0.001), or about 12% of mean income.

Next, we look at the results when respondents were asked "And how wiling would you be to accept cuts in your standard of living in order to protect the environment?" (GRNSOL). Responses were coded 1-5, with 1 being "Very willing" and 5 being "Not at all willing". Responses "Can't choose" or no answer were not included in the analysis. Regressing just GRNSOL against JOBINC, we find a very high correlation between the two (see table).

A more appropriate test of our hypothesis is to run the regression with education, race, and age included. When we do this, we find that all four variables are significant, with the

results given in the table. In this model, as in all others tested, GRNSOL is significantly and negatively correlated with JOBINC, indicating that the more important income is to an individual, the less likely they are to be willing to accept a cut in their standard of living in order to help the environment. There are cross-correlations among the variables in this model as well: GRNSOL and EDUC are negatively correlated (β = -0.058, p $<$ 0.001), as higher education is associated with an increased willingness to accept a drop in standard of living for the benefit of the environment; GRNSOL and AGE are positively correlated (β = 0.004, p $<$ 0.001), indicating that the young are more willing to accept a decline in standard of living than older Americans. GRNSOL and RACE are not correlated at the 95% confidence level.

The correlation between JOBINC and GRNSOL is extremely robust. To test this, I looked at all of the 673 variables, and of those that were correlated with JOBINC, none decreased the significance of GRNSOL in the regression below the 95% confidence level. I also used multiple combinations of these significant variables, and for models with a sufficient number of respondents (I used 400 as an arbitrary cut-off) I again did not find a reduction in the significance of GRNSOL below the 95% confidence level. It is possible that there exist combinations of variables that I did not test which would reduce the significance of GRNSOL in this regression, but the likelihood seems low that these would be meaningful if they exist at all, given the combinations that were tried.

This is a fairly strong result, and was not the case for EDUC, RACE, or AGE. For each of these variables it was fairly easy to find another variable which explained enough of the variation in JOBINC to make these variables insignificant. The fact that the correlation between JOBINC and GRNSOL is so strong as to be non-replaceable in a regression model and retains a very low p-value regardless of the model tested argues powerfully that this is a meaningful correlation, and not simply a spurious result.

I also tested the variable JOBMEANS in place of JOBINC. The two are ranked in the same question (and so not wholly independent, of course), but for JOBMEANS the respondent is asked to rate how important it is that a job "Gives the feeling of doing something meaningful". Using this as the independent variable, we find that GRNSOL is positively cor-

related with a p-value of < 0.001, both by itself and in combination with the variables RACE, AGE, and EDUC, all of which are significantly correlated with JOBMEANS at the 95% level. Interestingly, none of the other variables in the job-ranking question (JOBPROMO, JOBSEC, and JOBHOUR) correlate with GRNSOL in the model above (controlling for education, race, and age), even though they are not entirely independent of JOBINC and JOBMEANS. This lends further confidence to our conclusion, as it indicates that the correlations we have found are unlikely to be accidental, but instead are very strongly related to our hypothesis that a willingness to accept a decline in standard of living would be negatively correlated with a focus on income, and positively correlated with a desire for one's career to be "meaningful" in the eyes of the individual.

6 Conclusions

I have shown here that the values resulting from CBA are likely to not be unbiased, but instead to be more strongly influenced by individuals who value consumption potential over other, non-monetized benefits in their career choice. I have also shown that these individuals tend to be less willing to pay for environmental benefits than others who value consumption less. This analysis indicates that the use of an income-dependent monetary metric in policy-making is value-laden in a society where career choice includes pre-market benefits and where consumption beyond a given level may be seen as non-productive by a significant sector of society. If individuals pursue income with different levels of vigor, then it seems unreasonable to expect income-dependent measures to reflect meaningful societal values, even if we are willing to accept the consequences of large income disparities in determining consumption levels. In essence, the use of CBA can be said to partially disenfranchise citizens who voluntarily eschew consumption-maximizing career paths.

Along these lines, many observers have suggested the need for a large-scale, voluntary transition toward a less-consumptive, more sustainable society. It is important to keep in mind that during the transition period we would expect the impact of the disparity discussed here to increase as a larger fraction of the population accepted compensation in

non-consumptive form. If such a transition took place because a fraction of the population was concerned about ecological sustainability (or for any other reason associated with a particular set of values), then during the transition we would expect that public policy based upon economic measures would become increasingly weighted towards those whose career choices remained driven mostly or largely by income. This is an important point and applies to the use of any economic measures in the decision-making process, not only CBA; as values change, so should the fundamental assumptions of economists when they attempt to explain behavior and recommend policies based upon their models.

More work needs to be done to determine the current significance of this result. Given that the income difference between those who consider income to be of primary importance and those who give it the least importance is about 10% of median income, this might make a reasonable rough estimate for the strength of the effect upon the results of CBA. The value of CBA to policy-makers would certainly not be nullified by a 10% bias, though such a strong, consistent bias would need to be factored into a policy-maker's intuitive welfare function. At the same time, this survey did not include individuals with incomes above $163,000 (in 1986 dollars), and so it is possible that in leaving out the tails of the distribution significant effects related to motivation and market power have not been captured. Because of this, the likelihood of temporal changes in the strength of the effect, and for other reasons, the main emphasis of this paper is the direction of the bias, rather than its quantification. Given that relevant policy choices are often not continuous, but binary (a project is undertaken or it is not, a regulation is promulgated or it is not), a consistent bias, even if fairly weak, will often have the effect of driving nonoptimal policy choices if the decision variables are near the indifference point.

Therefore, this paper does not claim to argue that CBA is so biased as to be unusable for welfare economics, only that the bias demonstrated here is significant and warrants discussion. Also, this analysis begs the interesting question of how one might correct for the observed bias in future work with CBA. One possible improvement would be to increase the use of the willingness to accept compensation (WTA) criterion, rather than WTP. While WTA can still be sensitive to income, it is not limited by a strict income constraint, and so

a person is free to consider their entire income, rather than simply their monetary income, in deciding how valuable would be an increase in their monetary wealth. This would then obviate the current problem of whether a person takes their compensation pre-market or not.

In fact, many, and perhaps most, environmental CBAs deal with questions where something is being lost and the question is how much to curb or hinder economic activities that will lead to the loss. On theoretical grounds, these CBAs should be based on WTA instead of WTP anyway. However, WTP is often used instead (see discussions in Bateman and Willis, 1999; and for recent examples Turner, /em et al., 2003; and Turpie, 2003). This is in part because the unboundedness of WTA causes suspicion among many economists, especially when using non-market valuation methods. This paper simply indicates that the choice of one or the other may be more significant than is currently thought due to the specific bias demonstrated here, and that it is not acceptable to substitute WTP for WTA as is often done in conventional CBA. There may also be other methods which would allow analysts to consider an individual's total income (in the form of money, time, self-satisfaction, *etc.*), rather than simply monetary income, when determining prices for non-market goods. Essentially, the important distinction is that because consumer goods are purchased with individual consumption in mind, market prices are usually sufficient to determine their market value; however, when determining private values for public goods in CV studies, a broader definition for "income" in WTP needs to be considered.

References

[1] Adler, M.D., Posner, E.A. (eds), 2001. Cost-Benefit Analysis: Legal, Economic, and Philosophical Perspectives. University of Chicago Presss, Chicago.

[2] Bateman, I.J., Willis, K.G. (eds), 1999. Valuing Environmental Preferences: Theory and Practice of Contingent Valuation Method in the US, EU, and Developing Countries, Oxford University Press, Oxford, UK.

[3] Brekke, K.A., Howarth, B.H., 2000. The social contingency of wants. Land Econ. 76, 493-503.

[4] Brown, P.M., Cameron, L.D., 2000. What can be done to reduce overconsumption? Ecol. Econ. 32, 27-41.

[5] Craig, R.K., 2003. The Bush Administration's use and abuse of rulemaking, Part I: the rise of OIRA. Administrative and Regulatory Law News, 13, 8-10.

[6] Davis, J., Smith, T.W., Marsden, P.V., 2000. General Social Surveys: 1972-2000 Cumulative Codebook. Roper Center for Public Opinion Research, National Opinion Research Center, Chicago, IL.

[7] Dominguez, J., Robin, V., 1996. Your Money or Your Life. Penguin, New York.

[8] EPA, 2000. Guidelines for Preparing Economic Analyses, US Environmental Protection Agency 240-R-00-003, September.

[9] Farber, S.C., Costanza, R., Wilson, M.A., 2002. Economic and ecological concepts for valuing ecosystem services. Ecol. Econ. 41, 375-392.

[10] F.I.C., 2000. Communities Directory: a Guide to Intentional Communities and Cooperative Living. Fellowship for Intentional Community, Rutledge, MO.

[11] Frank, R.H., 2001. Why is cost-benefit analysis so controversial? In: Adler, M.D., and Posner, E.A., (Editors), Cost-benefit Analysis: Legal, Economic, and Philosophical Perspectives. University of Chicago Press, Chicago.

[12] Goulder, L., Kennedy, D., 1997. Valuing ecosystem services: philosophical bases and empirical methods. In: G. Daily (Editor), Nature's Services: Societal Dependence on Natural Ecosystems. Island Press, Washington, DC.

[13] Graham, J., 2002. Written testimony submitted by the Honorable John Graham to the U.S. House Committee on Small Business hearing on "The cost of regulation to small business," June 6. Washington, DC.

[14] Hirsch, F., 1976. Social Limits to Growth. Harvard University Press, Cambridge, MA.

[15] Jackson, T., Marks, N., 1999. Consumption, sustainable welfare and human need–with reference to UK expenditure patterns between 1954 and 1994. Ecol. Econ. 28, 421-441.

[16] Johansson, P-O., Kriström, B., Mäler (eds.), 1995. Current Issues in Environmental Economics. Manchester University Press, Manchester, UK.

[17] Jorgensen, B.S., Wilson, M.A., Heberlein, T.A., 2001. Fairness in the contingent valuation of environmental public goods: attitude toward paying for environmental improvements at two levels of scope. Ecol. Econ., 36, 133-148.

[18] Lintott, J., 1998. Beyond the economics of more: the place of consumption in ecological economics. Ecol. Econ. 25, 239-248.

[19] Mainwaring, L., 2001, Environmental values and the frame of reference, Ecol. Econ., 38, 391-402.

[20] Morgenstern, R.D., 1997. Legal and institutional setting for economic analysis. In: R.D. Morgenstern (Editor), Economic Analyses at EPA: Assessing Regulatory Impact. Resources For the Future, Washington, DC.

[21] O'Brien, M., 2000. Making better environmental decisions: an alternative to risk assessment. MIT Press, Cambridge, MA.

[22] Pearce, D., 1998. Economics and the Environment. Edward Elgar, Cheltenham, UK.

[23] Pildes, R.H., Sunstein, C.H., 1995. Reinvigorating the regulatory state, Chicago Law Rev., 62, 1-129.

[24] Porter, T.M., 1995. Trust in numbers: the pursuit of objectivity in science and public life. Princeton University Press, Princeton, NJ.

[25] Portney, P.R., 1990, Foreward. In: Portney, P.R. (Editor), Public policies for environmental protection. Resources for the Future Press, Washington, DC.

[26] Portney, P.R., 1998. The growing role of economics in environmental decisionmaking. Environment, 40, 14-18, 36-38.

[27] Railton, P., 1990. Benefit-cost analysis as a source of information about welfare. In: R.B. Hammond and R. Coppock (Editors), Decision Making: Report of a Conference. National Academy Press, Washington, DC.

[28] Røpke, I., 1999. The dynamics of willingness to consume. Ecol. Econ. 28, 399-420.

[29] Sen, A., 1967. Isolation, assurance and the social rate of discount. Q. J. Econ. 81, 112-124.

[30] Sen, A., 2002. The Discipline of Cost-Benefit Analysis. In: Rationality and Freedom. The Belknap Press of Harvard University Press, Cambridge, MA.

[31] Soderqvist, T., 1998. Why give up money for the Baltic Sea? Environ. Resource Econ. 12, 249-254.

[32] Sunstein, C.R., 2002. Risk and Reason. Cambridge University Press, Cambridge, UK.

[33] Turpie, J.K., 2003. The existence value of biodiversity in South Africa: how interest, experience, knowledge, income, and perceived level of threat influence local willingness to pay. Ecol. Econ., 46, 199-216.

[34] Turner, R.K., Paavola, J., Cooper, P., Farber, S., Jessamy, V., Georgiou, S., 2003. Valuing nature: lessons learned and future research directions. Ecol. Econ., 46, 493-510.

[35] Zeckhauser, R.J., 1981. Preferred policies when there is concern for probability of adoption. J. Env. Econ. Mgmt., 8, 215-237.

Table 1: Linear models for relationships with the independent variable JOBINC

Variable	β	p-Value	t-statistic	R^2	number of respondents
Constant	3.089	< 0.001	29	0.024	953
GRNSOL	-0.150	< 0.001	-4.8		
Constant	3.171	< 0.001	14	0.055	952
GRNSOL	-0.140	< 0.001	-4.4		
EDUC	0.026	0.044	2.0		
RACE	-0.176	0.019	-2.4		
AGE	0.010	< 0.001	4.7		